The Palestinian External Merchandise Trade: Determinants and Stability Investigation during 1968-1998

التجارة الفلسطينية الخارجية المنظورة: محدداتها واستقصاء لاستقرارها خلال الفترة ١٩٦٨ ـ ١٩٩٨

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Abstract:

This paper models external merchandise trade in the Palestinian Territories (West Bank and Gaza Strip) for the period 1968-1998. It gives an empirical evidence for this modeling. It provides an analysis for trade by using cointegration analysis and by estimating a vector error correction model. The cointegration analysis, mainly, suggests that only domestic demand and Jordanian demand are the significant determinants of Palestinian trade in the long- run, in addition to the existence of trade with the rest of world. On the other hand, the short-run results imply domestic demand and Israeli demand are two factors determining Palestinian trade in the short-run, under the prevailing imposed customs union with Israel. One common feature of both Dynamic cointegrating analysis and OLS estimation results is that Palestinian trade affected significantly, with a negative sign by growth of domestic demand. By using OLS estimation it investigates the instability of trade over study period. Both Chow's break point tests and CUSUM and CUSUMSQ tests results support the instability hypothesis for trade equation.

Key words: Palestine, Trade determinants, Imposed customs union, Cointerating Analysis, Stability tests

ملخص:

هذا البحث يُرسى نموذجاً لسلوك التجارة الفلسطينية الخارجية المنظورة خلال الفترة ١٩٦٨ - ١٩٩٨. كما ويعطي هذا البحث دليلاً عملياً على المحددات الرئيسية المؤثرة على التجارة الخارجية خلال الفترة المذكورة.تعطي الدراسة تحليلاً للتجارة الخارجية الفلسطينية باستخدام إجراء التكامل المشترك (Cointegration)، وكذلك بتقدير نموذج متجه تصحيح الخطأ (Vector Error Correction Model).

تحليل التكامل المشترك يقترح بشكل رئيس ان الطلب الفلسطيني المحلي والطلب الأردني هما المحددان الفاعلان للتجارة الفلسطينية في الزمن الطويل بالإضافة لوجود التجارة مع العالم الخارجي.في الجانب الآخر فان تحليل نموذج متجه الخطأ للزمن القصير يشير إلى ان الطلب الفلسطيني المحلي والطلب الإسرائيلي هما العاملان الرئيسان المحددان للتجارة الفلسطينية في ظل النظام الجمركي الإجباري السائد مع إسرائيل. تظهر الدراسة مظهراً مشتركاً لكل من تحليل متجه تصحيح الخطأ الديناميكي و تحليل طريقة المربعات الصغرى(OLS)، وهو التأثر السلبي، وبمعنوية إحصائية، للتجارة الفلسطينية بالنمو في الطلب (الناتج) المحلي. علاوةً على ذلك فإن الدراسة تستقصي مدى استقرار التجارة الفلسطينية. وتظهر الدراسة ان كلاً من فحوصات شاو (Chow) للتغيرات الهيكلية و طريقتي مجموع الانحرافات التراكمية (CUSUM) ومجموع الانحرافات التراكمية المربعة (CUSUMQ) تؤكد على حالة عدم الاستقرار لوضع التجارة الفلسطينية.

1. Introduction:

The economies of Palestinian territories (PTs) in the Gaza Strip and West Bank have undergone numerous shocks and instabilities following the Israeli occupation in 1967. Under imposed integration into the Israeli economy since the occupation, the trade of PTs is basically with Israel. The imposed integration has been in the form of compulsory or imposed customs union. This customs union, mainly, implies sharing the same common external tariff with Israel, which is charged at Israeli ports on imports from the rest of the world. It also involves the free flow of all Israeli products to PTs, but restriction on the flow of PTs agricultural and industrial goods to Israel. During the past three decades many non-tariff trade barriers (NTBs) imposed by Israel on PTs in addition to compulsory customs union affected trade with the rest of the world to a large extent. Yet, the geopolitics of the area let Jordan as a second trade partner for Palestine.

After mid 1980s, two events had considerable impact on the economies and the trade of PTs. One of these was the eruption of Palestinian Intifada in December 1987, which had lasted until 1993. The other one was the signing of Oslo peace agreement between Israel and The Palestinian Liberation Organization (PLO) in September 1993. The Intifada resulted in the loosening of strong and sustained integration with Israel. Following Oslo peace agreement, imposed customs union was adjusted and institutionalized by Paris Protocol in 1994 and this gave a

limited freedom to PTs to trade with the rest of the world. Though, PTs' trade was reoriented drastically towards Israeli markets following Oslo peace agreement, it is interesting to observe that when a slight window was opened for trade with the rest of the world in 1994, imports from the rest of the world revived to reach around 30% of total PTs imports in 1998.

Again for the first time Gaza Strip and West Bank restarted trade with Egypt, which had stopped in 1967 (UNCTAD, 2000).

Under the forced customs union, the movement of industrial goods from PTs to Israel was relatively free until the eruption of Palestinian uprising (Intifada) in December 1987. The following sub-periods, the Intifada period during 1988-1993, and post-Oslo period during 1994-1998, witnessed more restrictions on the movement of Palestinian industrial goods to Israel. Actually, the majority of Palestinian industries, which were dominant, mainly, during the period 1968-1993, had a subcontracting relation with their counterparts in Israel. This subcontracting relation, which still continues, involves a principal contractor based in Israel, often a firm or trading company that places orders with a subcontractor in PTs to produce components or to assemble finished products with the inputs provided by the principal. The final product can then be sold by the principal, either in Israel and PTs or in other markets.

In contrast, agricultural products faced two challenges. First one was the difficulty to access Israeli markets as a result of excessive barriers and restrictions in form of quality standards and heath regulations, which continued during 1968-1998 and increased markedly in the Intifada, during 1988-1993, and post Oslo, during 1994-1998 periods respectively. The other one was the fierce competition resulting from the free flow of Israeli agricultural products to PTs. Meanwhile, along the period 1968-1998 Israeli products moved freely to PTs. Thus, the PTs experienced the impact of imbalanced customs union.

Overall, Palestinian external trade directed sharply to Israel as a predominant partner. Israel dominated both Palestinian imports and exports over along period. Palestinian imports from Israel accounted for

more 80% of total imports throughout most periods. Also, Palestinian exports have grown rapidly with Israel since 1968 to reach about 49% of total exports in the early 1970s, 66% in the 1980s and about 85% in the early 1990s. In contrast, trade with Jordan, as a second traditional partner for PTs declined sharply with the diversion of trade to Israel. Exports to Jordan witnessed a sharp drop in the 1990s. They declined from over 30% of total Palestinian exports until the mid- 1980s to about 5% in 1998. Meanwhile, imports from Jordan recorded about 3% in the early 1970s and reached about 10% in the early 1990s. Clearly, imposed customs union implies two directions of trade with Israel and one direction with Jordan, related mainly to exports in most periods (Calculated by using data of ICBS, 1992; PCBS, 1998 and UNCTAD, 2000).

Many studies investigated the Palestinian trade for a limited period or a single sector. Elawna (1989), El-Jafari (1991, 1995 & 1997), The World Bank (1993), Arrnon and Weinblatt (1995), Awartani and Kleiman (1997), and UNCTAD (2000) are examples for these studies. Out of these studies The World Bank (1993) and El-Jafari (1995; 1997) used gravity models to investigate the behavior of Palestinian trade. Recently, Abugamea (2002) has evaluated the performance of Palestinian overall merchandise trade for the period 1968-1998, by employing panel analysis procedures for a specific supply function.

This study advanced over the mentioned studies in numerous aspects. It gives a specific modeling for Palestinian trade, which mirrors the implications of imposed customs union with Israel. It gives an empirical evidence for this modeling by introducing cointegration dynamic analysis to investigate trade long-run relations and short-run dynamics. Moreover, it uses trade-fitting equation to test for the instabilities effected trade over the past three decades.

The structure of this study is as follows: Section two gives a methodological framework, includes a specific modeling for Palestinian trade and a comment on data study. Section three gives an empirical evidence for Palestinian trade determinants. The first section composed of the elements of dynamic analysis; unit root tests, cointegration and

short-run dynamics. The second section discusses the stability of trade equation. Finally, section four gives the main conclusions.

2. Methodological Framework:

2.1. Modeling Palestinian Trade:

There are a number of approaches to modeling trade flows. Such models could be evaluated on the basis of their forecast performance or their in-sample diagnostics or both (Marsh and Tokarick, 1996 and Agenor, 1998). Actually, since 1970s many studies have been studying bilateral trade flows. Famous examples of these studies include Anderson (1979), Geraci and Prewo (1982), Khan and Knight (1988), Sanso et al. (1993), Lee and Swagel (1997), Agenor (1998), Paulino (2000) and Abugamea (2002). The earlier studies set foundations for trade flows and introduced the gravity equation in trade modeling. Anderson (1979) concluded that the gravity equation could be derived from the properties of expenditure system. Its use was limited to countries where the structure of traded-goods preference is very similar and where trade tax structures and transport cost structures are similar. Both the World Bank (1993) and El-Jafari (1997) employed gravity trade equations of the export supply and the import demand to assess the potential merchandise trade flows between the PTs and other countries. Mainly, El-Jafari's (1997) empirical work, which is based on 1992 statistics, indicated that removing non-tariff barriers (NTBs) imposed by Israel would double merchandise exports in PTs. Distinctly, Knight et al (1988) developed a model that takes account of the direct effects of imported inputs on exports. He suggests a reason why adjustment through import compression has caused difficulties for developing countries. Since imports are themselves critical inputs into the production of exports in many of these countries import compression tend to have an adverse impact on export. Yet, Geraci and Prewo (1982) used import demand estimates and export supply estimates to show that separation of price and non-price influences on trade seems infeasible.

Broadly, many of those studies derived the import demand and export supply functions by using the traditional Marshallian demand

function and supply function in microeconomics theory. The latest studies Agenor (1998), Paulino (2000) and Abugamea (2002) modeled trade to evaluate the performance of trade. Agenor's study related trade ratio (exports in terms of imports) to three main determinants, domestic and foreign demands, price measures and non-price measures. Again, Paulino (2000) evaluated the performance of trade by relating exports to both foreign demand and a relative price measure. Recently, Abugamea (2002) has evaluated the performance of Palestinian external trade by using specific export supply modeling, which relates trade ratio to economic activity, competitiveness measure and a measure for technology. It compares this performance with a selected group of neighboring countries. By employing fixed effects and random effects procedures it highlights the heterogeneity between Palestinian trade and those of these countries.

Given this background, our study follows export demand modeling approach used by Agenor (1998) to give a specific modeling for Palestinian trade. This model relates trade ratio (exports in terms of imports) to three main determinants; domestic demand, foreign demand and a specific relative price index, reflects the competitiveness of trade. For the Palestinian case, we use real gross domestic product as a proxy for domestic demand. Jordanian real gross domestic product and Israeli real gross domestic product are used as proxies for foreign demand. Also, for competitiveness measures we use three independent real effective exchange rates relating to trade partners, namely, Israel, Jordan and the rest of the world. Real effective exchange rates would be sensitive to three factors. These factors are nominal exchange rates, relative prices (foreign prices expressed in terms of domestic prices) and the share of trade partner in overall PTs trade (see, Appendix A). This model is derived as follows:

$$X = f(D, M, EP_f, P) \qquad (1)$$

where X is exports, M is imports, D represents both domestic and foreign demands, E is nominal exchange rate, P is domestic price index and P_f denotes foreign price indices.

Taking log-linear form, rearranging and decomposing d and p_f , we have,

$$tr = d_{pts} + d_f + e\Sigma(\gamma p_f)j/p \qquad (2)$$

where tr =ln (X/M), d_{pts}, d_f, γ are Palestinian domestic demand, foreign demand and the weight of trading partners, respectively.

We introduce real effective exchange rate here instead of real exchange rate, for the third term in the right side of equation (1), to consider the importance of trading partners weight in explaining Palestinian trade. In fact the impact of trading partnership with Israel, which can be expressed by real effective exchange rate, is considered a key point in introducing the coming dynamic analysis of Palestinian trade.

The variables, that are the focus of this analysis, are defined as follows, all given in natural logarithms.

- tr denotes the external merchandise trade ratio, defined as the ratio of total exports over total imports for Palestinian trade.
- prgdp is the Palestinian Territories- real gross domestic product used as a proxy for domestic demand.
- irgdp is the Israeli real gross domestic product used as proxy for Israel demand as the main trade partner.
- jrgdp is the Jordanian real gross domestic product, used as a proxy for the Jordanian demand as the second main trade partner.
- er1 is the real effective exchange rate, measuring the competitiveness of trade with the main partner (Israel) under the situation where Israeli currency is circulating in both PTs and Israel.
- er2 is the real effective exchange rate, measuring the competitiveness of trade with Jordan.
- er3 is the real effective exchange rate, measuring the competitiveness of trade with the rest of the world excluding Jordan under the assumption of world price indices which were evaluated at Jordanian prices.
- cer is the real effective exchange rate, measuring the competitiveness of trade with the rest of the world including Jordan. (see, Appendix A, for methodology of calculations of these variables).

Using the variables shown above we can simplify equation (1) in the econometric form;

$$tr= \alpha_0 +\alpha_1 prgdp+ \alpha_2 irgdp+ \alpha_3 jrgdp+ \alpha_4 er1+ \alpha_5 cer +\varepsilon_t \quad (3)$$

2.2. Data:

The study data used annual data for the period 1968-1998. In the absence of a unified source of Palestinian data, we collected data from different sources. Palestinian trade figures (exports in terms of imports in current US dollar prices) were obtained from Israeli Central Bureau of Statistics (ICBS), 1992, The World Bank, 1993 and Palestinian Central Bureau of Statistics (PCBS), 1998(1). Real gross domestic product figures equal GDP deflated by price indices were calculated using GDP and price indices from (ICBS), The World Bank, 1993 and Palestinian Monetary Authority (PMA), 2000 issue for Palestine and from IMF various issues and the World Bank, 1993 for both Jordan and Israel. We used inflation rates, which refer to the rate of change in the consumer price indices (CPI), as a poxy for price indices. In computing real effective exchange rate (cer), we use Jordanian price indices as a proxy for foreign price indices(2). In this case the nominal exchange rate is the dollar price of the Israeli New Shekle. Data on the Palestinian external merchandise trade ratio (tr) is plotted in Figure (1).

3. Empirical results(3):

3.1. Dynamic Analysis:

Time series procedures are used here to capture the dynamics of trade. Stationarity analysis investigates the time series properties of the variables involved in the analysis. It uses cointegration analysis to display long-run relation between trade and its determinants. Afterwards,

(1) With our recognition of numerous criticism to Israeli statistics, we see the available data relatively gives approximation for the behavior of these variables.
(2) Jordanian prices were taken as the approximate average of different countries prices levels, which include European countries, developing countries in Africa, Latin America, Asia, Arab and Muslim countries.
(3) Eviews 3.1 software is used for computations the following empirical results.

by using the results of cointegrating analysis, short-run dynamic adjustment will be explored.

3.1.1. Unit Root Tests:

Before performing cointegration tests, the time-series properties of different variables must be examined. The variables, that are the focus of the analysis, are as defined above.

Augmented Dickey-Fuller unit root tests are used to determine the time-series properties of the variables (see Dickey and Rossana 1994). The results of these tests are reported in Table (1).

The ADF test statistics reported in the table are given by the t-statistics on the estimated coefficient a_2 in the regression,

$$\Delta z_t = a_0 + a_1 t + a_2 z_{t-1} + \sum_{i=1}^{i=k} b_i \, \Delta z_{t-i} + \varepsilon_t, \quad t=1,2,...., n \qquad (4)$$

for each variable z, where z is the variables; tr, prgdp, irgdp, jrgdp, er1, cer. The value of k is determined by the highest order lag for which the corresponding t-statistic is significant. First, a constant term and then a constant and time trend t, are included in all regressions. Comparing t-statistics to (1,5) percents critical values with constant specification test and with time trend and constant specification test, respectively, shows that the variables; tr, prgdp, irgdp, jrgdp, cer are nonstationary in log-levels. However, the variable er1 is found stationary in log-level and hence are I (0) (see, Figure (1)).

Thus we can conclude from results that are shown in Table (1) that the variables; tr, prgdp, irgdp, jrgdp and cer are integrated of degree one and er1 are integrated of degree zero. This result will be used as a benchmark for the following cointegration analysis.

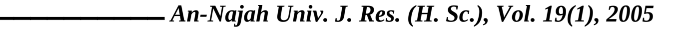


Table (1): Order of Integration: ADF Test Statistics for Annual Data (Estimation period: 1968-1998)

	Test Statistics K			
	Log-Level			
	Constant	**k**	**Constant + trend**	**k**
tr	0.8187	1	-1.9070	2
prgdp	-0.9334	1	-1.5675	2
irgdp	-1.3937	1	-2.6404	0
jrgdp	-2.0202	1	-2.9478	1
er1	-5.2601**	1	-4.2617**	1
cer	0.0189	1	-2.5864	1
	Test Statistics K			
	First differences			
	Constant	k	Constant + trend	k
tr	-3.7122**	1	-4.5319**	1
prgdp	-4.6025**	1	-4.8644**	1
irgdp	-4.4804**	1	-4.4637**	1
jrgdp	-4.7494**	1	-4.6709**	1
er1	I(0)			
cer	-3.5274*	1	-3.5012*	1

Notes:

(1) The asterisks* and ** indicate significance at 5 % and at 1 % levels, respectively, based on Macknnon critical values for rejection of hypothesis of a unit root (Lilien, 1998).

(2) We excluded the variables er2 and er3 from our analysis here and in the forthcoming, where we found these variables are only stationary in second differences (I(2) integrated).

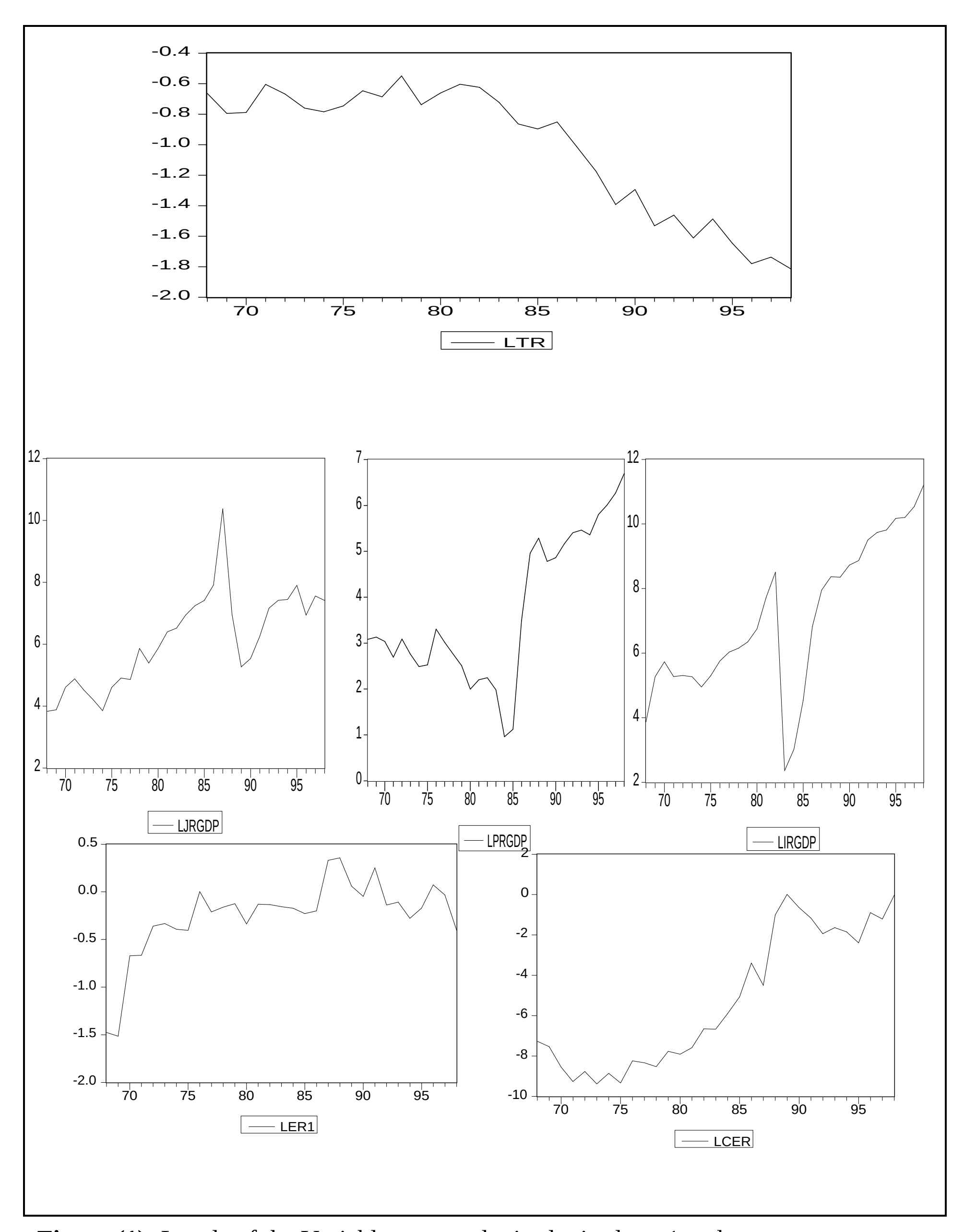


Figure (1): Levels of the Variables: tr, prgdp, irgdp, jrgdp, er1 and cer

3.1.2. Cointegration Analysis:

Once the order of integration of the variables; trade ratio, domestic and foreign demand and cer (competitiveness indicator) has been determined, the existence of long-run relationships between the variables is examined by using the co-integration analysis (Granger, 1986; Johansen, 1988, 1995). In this case a more satisfactory approach would be to employ Johnson's maximum likelihood (ML) procedure. This provides a unified framework for estimation and testing of cointegrating relation in the context of vector autoregressive (VAR) error correction model shown below.

$$\Delta z_t = a_{0z} + a_{1z}t - \Pi_z z_{t-i} + \sum_{i=1}^{k-1} A_{iz}\,\Delta z_{t-i} + \varphi_z w_t + \varepsilon_t,\ t=1,2,....,n \qquad (5)$$

Where z_t is an $m_z \times 1$ vector of jointly determined (endogenous) I(1) variables, w_t is a $q \times 1$ vector of exogenous/deterministic I(0), excluding the intercepts and/or trends. The disturbance vector ε_t satisfies the assumption that the residuals approximately independently identically normally distributed (iid) (0, ε) where ε is a symmetric positive-definite matrix. The intercept and the trend coefficients, a_{0z} and a_{1z} are $m_z \times 1$ vectors; Π_z is the long-run multiplier matrix of order $m_z \times m_z$, $\Pi_z = \alpha\beta'$, where α represents the speed of adjustment to disequilibrium, while β is a matrix of long-run coefficients such that the term $\beta' z_{t-i}$ embedded in this equation represents up to (n-1) cointegration relationships in the multivariate model; A_{iz} are matrices that capture the short-run dynamic effects; and φ_z is the $m_z \times q$ matrix of coefficients on the I(0) exogenous variables.

Before using cointegrating VAR, we need to make sure that the variables are in fact I (1), ascertain the nature of the intercept/trend in the underlying VAR model, and choose the order for the VAR. ADF tests results shown above denote that we cannot reject the hypothesis that the variables tr, prgdp, irgdp, jrgdp and cer are I (1) and er1 is I (0).

Using the unrestricted VAR and by choosing 3 as the maximum order for the following specification; (tr, prgdp, irgdp, jrgdp, cer) with the deterministic variables constant, trend and er1 in this case, both the Akaike information (AIC) criteria and Schwarz Bayesian criteria (SBC) select order 3.

With the above consideration, using cointegrating VAR analysis we show the results for cointegration rank(r) under the assumption of deterministic trend in data and unrestricted intercept and no trend in cointegrating relation in Table (2). In this respect, our selection for this result depends on fact that we need to test the joint hypothesis of both the rank order and the deterministic component, based on the so-called Pantula principle. That is, all models are estimated and the results are given from the most restrictive alternative (i.e, r=0 and Model 1) through to the least restrictive alternative (i.e, r=n-1 and Model 5). The test procedure is then to move through from the most restrictive model and at each stage to compare the trace (or λ max) test statistic to its critical value and only stop the first time the null hypothesis is not rejected (Lilien, 1998). Here model 1 to 5 denote the following specifications: no intercepts or trends, restricted intercepts and no trends, unrestricted intercepts and no trends, unrestricted intercepts and restricted trends and unrestricted intercepts and unrestricted trends respectively.

Table (2): Determining Cointegration Rank for External Trade Ratio Data (1968-1998)

Sample: 1968-1998
Included observation: 29
Test assumption: linear deterministic trend in data Lags 1to 1

Eigenvalue	**Likelihood Ratio**	**5 percent Critical Value**	**1 percent Critical Value**	**Hypothesized No. of CE(s)**
0.85018	108.0386	68.52	76.07	Non**
0.63413	52.9858	47.21	54.46	At most 1*

*(**) denotes rejection of the hypothesis at 5%(1%) significance level

LR test indicates 1 cointegrating equation at 1% significance level and 2 cointegrating equations at 5% significant level.

Unnormalized Cointegrating Coefficients:

tr	**prgdp**	**irgdp**	**jrgdp**	**cer**
-1.04382	-0.30504	-0.01946	-0.65497	0.02483
-0.10934	0.14541	-0.136323	0.21266	-0.04612
0.67521	0.30844	-0.15433	-0.10333	0.10042
1.10671	-0.04927	0.07258	0.06751	0.13686
0.720939	-0.01689	-0.03793	0.00379	0.06123

… Continue table (2)

Normalized Cointegrating Coefficients: 1 cointegrating Equation					
tr	**prgdp**	**irgdp**	**jrgdp**	**cer**	**constant**
(1.0000)	0.2922 (0.0362)	0.01864 (0.01690)	0.033499 (0.0189)	-0.02373 (0.01648)	-0.51467

Notes:

(1) The eigenvalues are presented in the first column, while the second column (likelihood Ratio) gives the LR test statistic: $Q_r = - T \Sigma^{k}_{i=r+1} \log(1-\lambda_i)$ for r=0, 1,.k-1, where λ_i is the ith largest value.

(2) We restrict our analysis on one cointegrating equation, where we expect more sound economic meanings.

From Table (2) it can be seen that LR test implies the choice of r =1 that is we have one cointegrating relation. We can interpret this cointegration vector based on economic theory as the trade ratio proxying the demand for exports and imports.

Under the assumption of r=1 cointegrating relationship, by following Lilien (1998), we have one normalized tr cointegrating equation (For the identification of the cointegrating vectors, see Pesaran and Smith (1998)). Given our theoretical model and our knowledge of the institutional characteristics of both trade and economies of PTs, we interpret this equation as trade ratio equation. This leads to the following long run relation:

tr= -0.5147+ 0.2922* prgdp + 0.0186*irgdp+ 0.0335*jrgdp -0.0238*cer
(0.0362) (0.0169) (0.0189) (0.0165)

This relation highlights the positive impact of prgdp and jrgdp on tr, respectively. In this relation a 100% increase in prgdp will result in 29.2% and a 100% increase in jrgdp will result in 3.4% increase in tr. Meanwhile a 100% increase irgdp will result in 1.9% increase in tr. Furthermore, this relation displays the negative impact of cer (a proxy for Palestinian loss of competitiveness and trade with the rest of the world) on trade ratio (tr), where a 100% increase in cer reduces tr by 2.4%. Overall, this relation reveals that in the long run foreign demand, other than Israeli demand, Jordanian demand, in addition to domestic demand (prgdp), has positive impact on Palestinian trade Figure (2) shows the

positive impact of variables prgdp, jrgdp and cer on Palestinian long run trade ratio (LRNLTR).

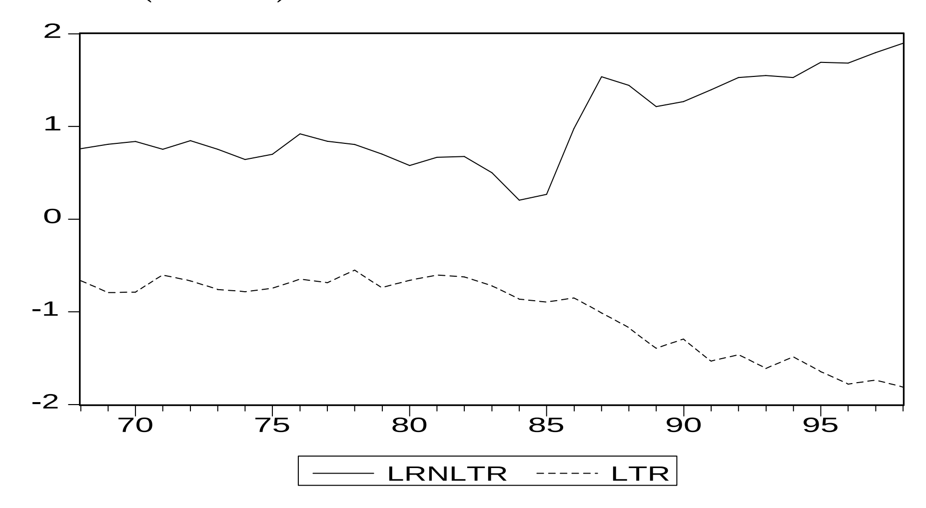


Figure (2): The Plot of Long-Run Relation of Trade Ratio (LRNTR) compared to Actual Trade Ratio (LTR) (log-levels)

Thus cointegration analysis concludes long run relation between Palestinian external trade ratio and both domestic demand, traditional market demand (Jordanian demand) and trade with the rest of the world exists.

3.13. Short-Run Dynamics:

In the context of equation (5) more attention is given to capture the short-run dynamics of the trade ratio by using the formula (6). Let Z= [tr, prgdp, irgdp jrgdp, cer]; the VEC model (Vector Error Correction Model) to be estimated is,

$$\Delta Z_t = \Sigma A_k \, \Delta Z_{t-i} + \alpha \text{ ecm } (-1) + \varepsilon_{t,} \; k = 1, ..., n \qquad (6)$$

Where A_k is (5×5) matrix and α a (5×1) vector of parameters to be estimated, and ecm is the error correction term. In the equation, n denotes the lag length, and ε_t a vector of error terms. The errors are assumed to be identically and independently distributed, with zero means and constant variances and covariances. Thus, each variable in the VEC model is assumed to be determined by n lagged values of each of the variables in

the system (including its own lagged values) and the error correction term, ecm (-1).

The VEC model described by equation (6) is estimated over the period 1968-1988. All variables are restricted to have identical lag lengths across equations to cut down the number of possible specifications. The optimal lag length, which is determined on the basis of Akaike's Final Prediction Error statistic, was equal to 3. The results shown in Table (3) yielded estimates of the coefficients of error correction terms ecm1 (-1) in the trade ratio equation of 0.6696. It appeared with negative coefficients as expected and it has a t-ratio equal to 2.8416, which is statistically significant. The significance of ecm1 (-1) implies a noticeable adjustment to disequilibrium towards the cointegrating relationship. Trade equation in Table (3) shows that trade ratio (tr) growth only responses significantly (with a positive sign) to both prgdp and irgdp in the previous second year and to irgdp first period lag, besides to its own two periods lag. Moreover, it responses significantly (with a negative sign to prgdp first period lag).

Table (3): Error Correction Model Equations (ECM) for the Variables tr, prgdp, irgdp, jrgdp, cer Estimated by OLS based on Cointegrating

Cointegrating Equation 1

tr (-1)=-0.1825+0.2185* prgdp (-1)+ 0.0222* irgdp (-1) + 0.0431* jrgdp (-1) + 0.0046* cer (-1)

	prgdp (-1)	irgdp (-1)	jrgdp (-1)	cer (-1)
	(0.01390)	**(0.0077)**	**(0.0092)**	**(0.0053)**
	(15.6153) **	**(2.8862) ****	**(4.7071) ****	**(0.86740)**

Regressors	**dtr**	**dprgdp**	**dirgdp**	**djrgdp**	**dcer**
ecm1(-1)	-0.6696 (0.2357) (-2.8416) **	-4.1111 (0.8283) (-4.963) **	-1.3201 (4.43189) (-0.2979)	-3.9876 (2.5888) (-1.5403)	0.7275 (2.7528) (0.2643)
Dtr (-1)	0.24132 (0.30610) (0.78837)	3.21301 (1.07591) (2.9863) **	-1.505417 (5.75686) (-0.26150)	4.30815 (3.36281) (1.28112)	-1.66471 (3.57583) (-0.46554)
Dtr (-2)	0.55574 (0.24136) (2.30251) **	0.95879 (0.84837) (1.13015)	-3.42201 (4.53936) (-0.75385)	2.113435 (2.65162) (0.79704)	-1.25083 (2.81959 (-0.44362)
Dprgdp (-1)	-0.09337 (0.05172) (-1.80524) *	0.41634 (0.18181) (2.29003) **	1.37946 (0.97279) (1.41805)	0.43533 (0.56824 (0.76610)	-0.39474 (0.60424) (-0.44362)

… Continue table (3)

Regressors	**dtr**	**dprgdp**	**dirgdp**	**djrgdp**	**dcer**
Dprgdp (-2)	0.137603 (0.06864) (2.00478) *	0.206356 (0.24126) (0.85534)	-0.718707 (1.29088) (-0.55676)	-0.07646 (0.75406) (-0.10139)	-0.09214 (0.80182) (-0.11491)
Dirgdp (-1)	0.038716 (0.01345) (2.87875) **	0.24179 (0.04727) (5.1149) **	-0.123734 (0.25294) (-0.4892)	0.00292 (0.14775) (0.01977)	0.01861 (0.15711) (0.11848)
Dirgdp (-2)	0.058166 (0.01904) (3.05496) **	0.15291 (0.06692) (2.28489) **	-0.36210 (0.35909) (-1.01122)	0.14146 (0.20917) (0.6762)	-0.05219 (0.22242) (-0.23465)
Djrgdp (-1)	0.047929 (10.04102) (1.16839)	-0.10859 (0.14419) (-0.75318)	-0.545113 (0.77149) (-0.70657)	-0.06301 (0.45066) (-0.13982)	0.25258 (0.47921) (0.52709)
Djrgdp (-2)	-0.06392 (0.04098) (-1.55954)	0.143955 (0.14406) (0.99929)	0.620074 (0.77080) (0.80445)	-0.34831 (0.45026) (-0.77359)	0.88235 (0.47878) (1.84292)
Dcer (-1)	0.057355 (0.04201) (1.36518)	-0.11174 (0.14767) (-0.75665)	-0.77052 (0.79014) (-0.97518)	0.29847 (0.46155) (0.64660)	-0.23823 (0.49079) (-0.48541)
Dcer (-2)	-0.033881 (0.03730) (-0.90844)	0.17869 (0.13109) (1.36309)	0.50592 (0.70143) (0.72128)	-0.12091 (0.40973) (-0.29509)	0.66497 (0.43569) (1.52625)
constant	-0.05823 (0.03373) (-1.72636) *	0.25659 (0.11857) (2.14209) *	0.12331 (0.63443) (0.19435)	0.27291 (0.37060) (0.73640)	0.17672 (0.39407) (0.44845)
Ler (-1)	-0.157511 (0.10532) (-1.49561)	0.99013 (0.37018) (2.67474) **	0.19013 (1.98070) (0.09600)	0.06759 (1.15700) (0.05841)	0.98649 (1.23030) (0.80183)
			Diagnostic Statistics		
$\mathbf{R^2}$	0.7331	0.8865	0.2832	0.5437	0.4679
Adjusted $\mathbf{R^2}$	0.5195	0.7958	-0.2903	0.1787	0.0423
SSR	0.1013	1.2511	35.8255	12.2243	13.8222
F statistic	3.4334	9.7664	0.4938	1.4897	1.0992
AIC	-1.8556	0.6585	4.0129	2.9376	3.0605
SC	-1.2371	1.2769	4.6314	3.5562	3.6790

Notes:

(1) Standard errors and t-values are in parentheses respectively.

(2) The asterisks** and * indicate significance at 5 % or 1 % and 10 % levels, respectively.

(3) The performance of cer equation denotes that Palestinian trade partnership with the rest of world affected insignificantly by trad determinants at short-run time.

Noticeably, even though jrgdp seems to effect tr in the long run, as shown above, it has no impact on trade in the short run. In contrast, while irgdp has no impact on tr in the long-run, it affects tr growth with first and two periods lag. This situation mirrors the impact of imposed customs union between PTs and Israel, where trade with Jordan and the rest of the world was restricted.

Inspection of the available diagnostics tests for VEC model as given in Table (3), shows that tr and prgdp enjoy a high explanatory power, where R^2 equals 0.73 and 0.88 for tr and prgdp equations, respectively, compared with the other equations in the system. Moreover, tr equation has a lower SSR, AIC and SC values compared with other variables.

Thus, these results are, mainly, consistent with the impact of institutional constraints on both Palestinian trade and domestic product. Also, one main implication of short-run analysis is that Palestinian domestic demand (domestic product), regional demand (Israeli-Jordanian demand) and trade with the rest of the world are main determinants for Palestinian external trade.

3.2. Stability of trade equation:

Here, we will use our modeling for trade ratio, introduced above, to investigate the assumed instability of Palestinian trade over the past three decades.

Before employing stability tests based on OLS estimation results of trade equation (3) in Table (4), we see of noteworthy to highlight main feature of trade ratio elasticities within this estimation. With our recognition of criticism to these results in view of the nonstionarity of equation variables, as denoted in the previous section, we see a main feature is that trade ratio responses significantly and with negative sign to growth in prgdp. This result shows some similarity to that of shor-run dynamic analysis, where trade ratio impacted negatively by prgdp growth in first period lag. We can refer this decline in trade ratio (exports in terms of imports) to a continuous an increase in imports coexisted with a decline of exports under the prevailing constraints on Palestinian trade.

Table (4): Regression Specifications for Trade Ratio Equation (OLS estimation) 1968-1998.

Explanatory variables	**(1)**	**(2)**	**(3)**	**(4)**
Constant	-0.9905 (-3.0071) **	-1.5078 (-4.9162) **	-5.7432 (-0.2269)	-1.4813 (-4.0124) **
Prgdp	-0.0912 (-2.0166) *	-0.0483 (-1.2358)	-0.0199 (-0.4612)	-0.0651 (-1.4735)
Irgdp	-0.0127 (-0.4720)	0.0025 (0.1079)	0.0160 (0.0059)	0.0099 (0.3911)
jrgdp	0.0086 (0.3035)	0.0375 (1.5282)	0.0476 (1.9805) *	0.0326 (1.1143)
er1	0.0239 (0.2612)	-0.0246 (-0.3035)	-0.0383 (-0.3685)	0.1137 (0.6674)
cer	-0.0612 (-3.8572) **	-0.0775 (-5.2713) **	-0.0153 (-0.7503)	-0.081 (-4.5445) **
D0	-	-0.2173 (-2.2577) *	-	-0.1499 (-1.2440)
Dcer	-	0.0564 (2.1848) *	-	0.06649 (2.2595) *
R^2	0.87818	0.9239	0.9435	0.9319
Se	0.16001	0.1319	0.1139	0.1348
SSR	0.64011	0.4001	0.2734	0.3454
DW- Statistics	1.2100	1.5310	1.9200	2.0010

Notes:

(1) t-values in parentheses.

(2) The asterisks** and * indicate significance at 1 percent level and 5 percent level, respectively.

(3) Specifications (3) and (4) are related to the first and second specifications, respectively after treating for autocorrelation, which reflected in terms of DW statistics value by using the Cochrane-Orcutt (1949) procedure.

Two dummy variables for the intercept and (cer) coefficients in columns (2) and (4) of Table (4) showed a shift in external trade since 1994. However it can be hypothesized that external trade is subjected to more than one shift along the past three decades. Model instability of external trade that revealed through the plot of tr (Figure (1)), resulted mainly from the implementation of the imposed customs union with

Israel. In addition to the shift in trade after 1994, we have also hypothesized that the early 1980s witnessed an impressive negative shift for trade as a result of external restriction on Palestinian exports imposed by both Israel and Jordan (see, El-Jafari, 1997b).

For this purpose we employ two structural shift tests; one depends on a priori selection of break points, that is Chow's break point tests, and the second one is used to reveal instability in general, that is CUSUM and CUSUMSQ tests.

Firstly, we carried out Chow's (1960) break point test for stability for the specification in Table (5). The equation under review is fitted separately to two sub-samples over the period from 1968 to 1998. Summing the residual sum of squares for each sub-sample gives the unrestricted residual sum of squares. The equation is then fitted to the complete set of sample observation, which yields the restricted residual sums of squares.

Using regression result for the sum of square residuals in Table (5), Chow test with a one breakpoint in 1983 was computed. It has a significant F statistic value (4.84) compared with 1 and 5 percents critical values (3.94 and 2.63) respectively. Therefore, we reject the constant parameter hypothesis. Similarly, by setting two breakpoints in 1983 and 1993, Chow test gives F-statistic (9.77) values. Thus both results support the instability hypothesis for trade equation.

Table (5): Structural Shifts in Trade Ratio Equation

Regressors	**(1) 1968-1998 31 observation**	**(2) 1968-1982 15 observation**	**(3) 1983-1998 16 observation**	**(4) 1968-1992 25 observation**	**(5) 1993-1998 6 observation**
constant	-0.8826 (-3.0600) **	-1.1881 (-2.8743) *	-0.4350 (-1.3221)	-1.2434 (-4.2377) **	0.9103 (0.5725)
prgdp	-0.1039 (-2.4903) *	0.0579 (1.3666)	-0.0273 (-0.3101)	-0.0706 (-1.7939)	0.1473 (0.3224)
irgdp	-0.0126 (-0.4850)	-0.0845 (-2.7302) *	-0.2026 (-2.3775) *	0.0037 (0.1516)	-0.3189 (-0.6290)
jrgdp	-0.0013 (-0.0496)	0.1748 (4.7450) **	0.1681 (2.1534) *	0.0191 (0.7616)	-0.0519 (-0.1616)

… Continue table (3)

Regressors	(1) 1968-1998 31 observation	(2) 1968-1982 15 observation	(3) 1983-1998 16 observation	(4) 1968-1992 25 observation	(5) 1993-1998 6 observation
er1	0.0559 (0.6285)	-0.0079 (-0.1673)	0.0636 (0.2907)	-0.0166 (-0.1878)	-0.5210 (-1.5456)
cer	-0.0682 (-4.1192) **	0.0036 (0.1449)	(0.1394) (1.6174)	-0.0737 (-4.8281) **	-0.0599 (-0.33135)
R^2	0.8871	0.7734	0.8916	0.8431	0.9472
R^{-2}	0.8644	0.6475	0.8374	0.8039	0.6832
S.e	0.15431	0.0457	0.1472	0.1399	0.0778
SSR	0.5953	0.0198	0.2166	0.3918	3.588
F-statistic	39.2635	6.1426	16.4522	21.49	0.0061

Notes:

(1) t-values in parentheses.

(2) The asterisks** and * indicate significance at 1 percent level and 5 percent level, respectively.

(3) The F-version of the chow test statistics is defined by;

$F= (SSR_r-SSR_{u1}-SSR_{u2})/\ K/(SSR_{u1}+SSR_{u2})/\ (T_1+T_2-2K) \sim F\ (K, T_1+T_2 -2\ K)$, where SSR_r is the OLS residual vector for the two sample periods together. SSR_{u1} and SSR_{u2} are the OLS residual vector for the first and the second sample periods, respectively. T_1, T_2 and K are the number of observation for the first and the second samples and the coefficient estimates, respectively.

Given the fact the chow's break point tests depend upon a priori selection of those break points, there is a need for tests that reveal model instability in general wherein external trade witnessed fluctuations beyond those periods. For this purpose two tests CUSUM and CUSUMSQ are suggested by Brown et all (1975). The CUSUM test is based on the statistic;

$$W_r = 1/\hat{\sigma}\sum_{j=k+1}^{r} V_j, \quad r=k+1,k+2,....n \qquad (7)$$

and

CUSUMSQ test is based on the statistic;

$$WW_r = \sum_{j=k+1}^{r} V^2_j / \sum_{j=k+1}^{n} V^2_j, \quad r=k+1,k+2,....n \qquad (8)$$

while W_r test based on the recursive residual V_t , the WWr test based on the squared recursive residuals V^2j. Vt is the recursive residual based on the first j observation given by $V_r = (y_r - x'_r B'_{r-1})/d_r$ where $d_r = \{1 + x'_r (x'_{r-1} x_{r-1})^{-1} x_r\}^{½}$ and B'_r is the recursive coefficients. Here, equation (7) involves plotting Wr and a pair of strait lines for values r=k+1, k+2, ... n and equation (8) involves plotting WWr and a pair of strait lines whose equation are given by; WW= ±c0+(r-k)/(n-k), r=k+1,k+2,.....n (see, Brown et al. (1975) and Harvey (1981)).

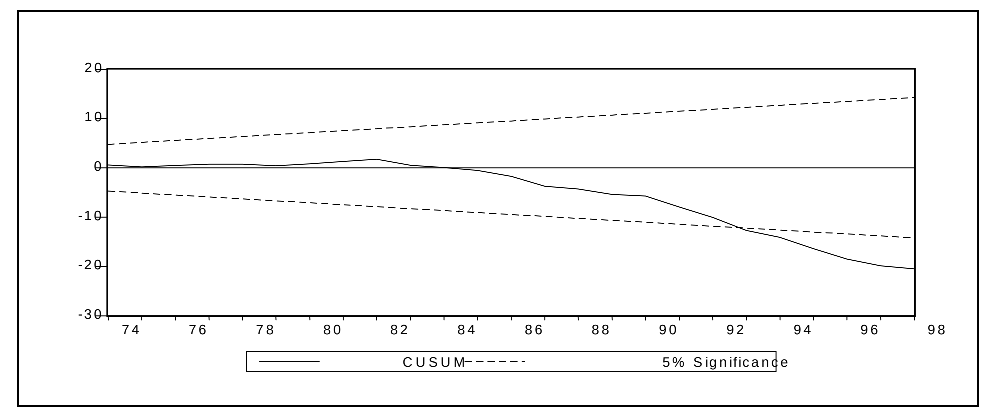


Figure (3): Plot of Cumulative Sum of Recursive Residuals in the Regression based on Equation (7).

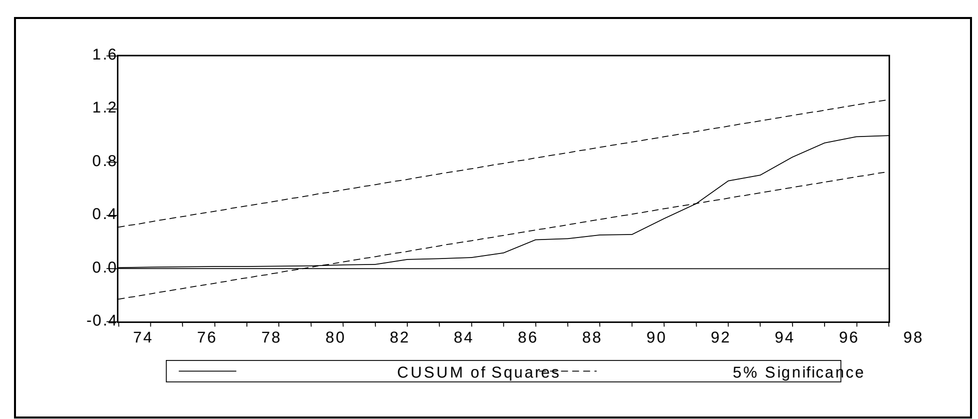


Figure (4): Plot of Cumulative Sum of Squared Recursive Residuals in the Regression based on Equation (8).

CUSUM & CUSUMSQ statistics are represented in figure (3) and (4) respectively. The CUSUMSQ test rejects the null of stability hypothesis at 5% significant level. It reveals that structural break occurred at 1981 and 1993, where the recursive residual intersected or approaching the intersection of the critical value. Also the CUSUM test rejects the null of stability hypothesis at 5 % significant level and reveals shift at 1993.

Overall these tests confirm the structural shifts occurred for Palestinian trade in both the early 1980s and in the end 1993.

4. Conclusions:

This study specifies the determinants of Palestinian external trade as domestic demand, foreign demand expressed in terms of Israeli and Jordanian demand and two main real effective exchange rates for the trading partners; Israel and the rest of the world, including Jordan. It provides an analysis for trade by using cointegrating analysis and by estimating a vector error correction model. The cointegration analysis, mainly, suggests that only domestic demand and Jordanian demand are the significant determinants of Palestinian trade in the long- run, in addition to the existence of trade with the rest of world. On the other hand, the short-run results imply domestic demand and Israeli demand are two factors determining Palestinian trade in the short-run. One common feature of both Dynamic cointegrating analysis and OLS estimation results is that Palestinian trade affected significantly, with a negative sign by growth of domestic demand, represented by gross domestic product. Moreover, by using OLS estimation it investigates the instability of trade over study period. Both Chow's break point tests and CUSUM and CUSUMSQ tests results support the instability hypothesis for trade equation. The main two shifts of Palestinian merchandise trade occurred in the early 1980s and in 1993. While the first shift resulted from a decrease pattern in exports, the second one is due to a shift in imports from outside the region, other than both Israel and Jordan.

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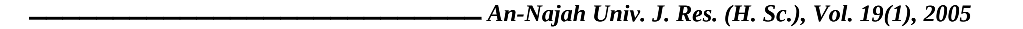
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Appendix A
The Labels and Description of variables and Formulas used in Time Series Analysis*

LABEL	FORMULA	DESCRIPTION
Z		Total Palestinian Merchandise Exports
M		Total Palestinian Merchandise Imports
TR	=(Z/M)	Merchandise Trade Ratio
LTR	=LN(Z/M)=tr	Natural Logarithm of Trade Ratio
Z1		Palestinian Merchandise Exports to Israel
LZ1	=z1	Natural Logarithm of Z1
Z2		Palestinian Merchandise Exports to Jordan
LZ2	=z2	Natural Logarithm of Z2
Z3		Palestinian Merchandise Exports to the rest of world
LZ3	=z3	Natural Logarithm of Z3
M1		Palestinian Merchandise Imports from Israel
LM1	=m1	Natural Logarithm of M1
M2		Palestinian Merchandise Imports from Jordan
LM2	=m2	Natural Logarithm of M2
M3		Palestinian Merchandise Imports from the rest of world

…Continue Appendix A

LABEL	FORMULA	DESCRIPTION
LM3	=m3	Natural Logarithm of M3
GDPP		Palestinian Gross Domestic Product
GDPI		Israeli Gross Domestic Product
GDPJ		Jordanian Gross Domestic Product
PPTs		Palestinian Territories Prices Index
PI		Israeli Prices Index
PJ		Jordanian Prices Index
PRGDP	=(GDPP/PPTs)	Palestinian Real Gross Domestic Product
IRGDP	=(GDPI/PI)	Israeli Real Gross Domestic Product
JRGDP	=(GDPJ/PJ)	Jordanian Real Gross Domestic Product
LPRGDP	=prgdp	Natural Logarithm of PRGDP
LIRGDP	=irgdp	Natural Logarithm of IRGDP
LJRGDP	=jrgdp	Natural Logarithm of JRGDP
E1		Nominal Exchange Rate of Israeli NIS per US dollar
E2		Nominal Exchange Rate of Israeli NIS per Jordanian dinar
P4	=PJ/PPTs	Relative Prices between Jordan and PTs
P5	PI/PPTs	Relative Prices between Israel and PTs
ER1	=((Z1+M1) / (Z+M))*P5	Real Effective Exchange Rate for Israel based on Relative Prices
LER1	=er1	Natural Logarithm of ER1
ER2	=((Z2+M2) / (Z+M))*P4*E2	Real Effective Exchange Rate for Jordan based on Relative Prices

…Continue Appendix A

LABEL	FORMULA	DESCRIPTION
LER2	=er2	Natural Logarithms of ER2
ER3	=((Z3+M3) / (Z+M))*P4*E1	Real Effective Exchange Rate for the rest of world excluding Jordan based on Relative Prices
LER3	=er3	Natural Logarithms of ER3
CER	=((Z2+M2+Z3+M3) / (Z+M))*P4*E1	Real Effective Exchange Rate for the rest of world including Jordan based on Relative Prices
LCER	=cer	Natural Logarithm of CER

* denotes multiplication